DOCUMENT RESUME

ED 199 050 SE 034 174

AUTHOR Hollin, Dewayne
TITLE Vocational-Technical Marine Career Opportunities in Texas.
INSTITUTION Texas A and M Univ., College Station. Sea Grant Coll. Program.
REPORT NO TAMU-SG-80-402
PUB DATE Mar 80
NOTE 27p.; Not available in hard copy due to copyright restrictions. Small-sized document.
AVAILABLE FROM Sea Grant College Program, Texas A&M University, College Station, TX 77843 (single copy free, write for price of multiple copies).

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS Career Education; *Employment Opportunities; *Marine Technicians; *Oceanography; Science Careers; Science Education; *Seafarers; Secondary Education; *Trade and Industrial Education; Vocational Education

ABSTRACT

Presented are background information and descriptions of jobs in various Texas marine industries, as well as a summary of the training required for particular positions. Since the emphasis is upon vocational-technical training for immediate job placement, most opportunities discussed require a high school diploma and some on-the-job education. Positions covered include those involving marine transportation, energy exploration, fisheries, shipbuilding, and commercial diving. Each section concludes with a listing of training institutions and organizations of marine industries. (Author/WB)

**********
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
**********

U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

ED199050

# Vocational-Technical Marine Career Opportunities in Texas

"PERMISSION TO REPRODUCE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

Laura Colunga

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

by
Dewayne Hollin
Marine Business Management Specialist
Marine Advisory Service
Texas A&M University

SE 034 174

Sea Grant College Program
Texas A&M University
2

Reproduction of any part of this book, except for classroom instructional use, is prohibited without prior approval from the publishers, the Texas A&M University Sea Grant College Program.

# Vocational-Technical Marine Career Opportunities in Texas

by
Dewayne Hollin
Marine Business Management Specialist
Marine Advisory Service
Texas A&M University

TAMU-SG-80-402
March 1980

*Photo Credits:*
*British Petroleum Co., Ltd., page 2*
*Texas Highway Department, page 17*
*Zapata Offshore Co., pages 13, 14*

# Preface

This publication is to assist high school counselors, teachers and students in better understanding the career opportunities available in the Texas marine industry. It provides background information and descriptions of jobs in various Texas marine industries, as well as information about the training needed to enter particular positions.

The main focus is on vocational-technical training for immediate entry into the marine industry. Some job opportunities discussed in this publication may require a college degree, but most require a high school diploma and some technical or on-the-job training within the marine industry. Because of space and time limitations, it is not possible to include all the job opportunities in the marine industry.

Information for this publication was gathered from industry representatives and at programs sponsored by the Marine Advisory Service, Sea Grant College Program, Texas A&M University. The information presented was the best available at the time of writing, Spring 1980. Wage data, which has a tendency to become dated quickly, are current as of January/June 1980. Job availability also is dependent on economic conditions and industry fluctuations in employment. Organizations listed at the end of each section should be able to provide updated information on request.

We hope this publication will be a useful reference for marine career orientation.

Dewayne Hollin
Marine Business Management Specialist

# Texas Marine Industries — An Overview

The Texas Gulf Coast is one of the richest and most diversified coastal areas in the United States. It ranges from the vast industrial complexes of the upper coast to large agricultural regions of the Lower Rio Grande Valley.

Within the coastal region is one of the nation's most highly diversified group of marine industries. Along the 367-mile arc of the Texas coast, several thousand marine operations are involved in offshore energy development, offshore marine services and transportation, inland marine transportation, offshore construction, diving, commercial fisheries, shipbuilding and repair and deepsea maritime transportation.

More than 30 offshore drilling contractors are based in Texas, operating more than 150 drilling rigs each year in the Gulf of Mexico. The rigs are under contract to the many oil and gas companies based in Texas and Louisiana. At the end of 1979, there were more than 130 mobile offshore rigs and about 100 self-contained platform rigs working in waters off Louisiana and Texas, and another 23 offshore mobile rigs under construction in Texas shipyards.

The Texas marine transportation industry is one of the most diversified in the world. It includes the operation of offshore-service vessels, tugs, work boats, supply vessels, survey vessels, geophysical vessels, crewboats, barges, tankers, inland towing and pushboats and various sizes and types of deepdraft cargo ships. Almost three-fourths of all goods shipped from Texas travel by water. The Port of Houston is the third largest in the nation in total tonnage and second in foreign trade tonnage. The Gulf Intracoastal Waterway extends 426 miles along the Texas coast from Brownsville to Orange and is the artery through which more than 60 million short tons of liquid and bulk shipments move annually.

There are more than 30 Texas-based offshore transportation companies operating in excess of 350 offshore supply, tug supply, production standby, crew and seismic boats around the world. There are an estimated 2,000 or more offshore service boats operating in the Gulf of Mexico and about 100 vessels under construction.

More than 70 Texas shipbuilding and repair companies, ranging from a small family-run business employing four people to large shipbuilding giants employing over 2,000 workers are located in Texas. Their products vary from construction of small fishing vessels and crewboats, to ocean-going merchant ships and large offshore drilling rigs.

About 25 commercial diving companies are based in Texas and Louisiana, providing such services as underwater maintenance and inspection, welding,

burning, blasting, salvage, marine construction, underwater surveys, ship and barge repair, subsea installations, underwater corrosion control and protection. The size varies from a one-diver and tender operation to large offshore diving operations employing 1,000 to 1,400 people including divers, diver/welders, diving tenders, technicians and supervisory personnel performing a variety of services for the offshore industry around the world.

An estimated 28,000 commercial licenses were issued in 1978 to fish Texas waters. About 10,600 boat licenses were issued, and about one-third of these vessels were operating in the Gulf shrimping industry. Another 1,500 people are employed in the Texas seafood processing industry.

The highly diversified nature of the marine industry located along the Texas coast assures continued expansion and economic growth. From oil and gas exploration and production to marine transportation the picture looks the same — more jobs, more facilities and more economic stimulus.

# Maritime Transportation Industry

The three basic components of the maritime transportation industry are merchant marine or deepsea, inland marine or barge and towing, and offshore transportation. Each is a different industry with different companies, different types of vessels and, to a large degree, different people. In some ways, however, they are the same industry, particularly when it comes to licensing requirements for vessel operations as regulated by the U.S. Coast Guard. Union membership has played a large role in filling manpower requirements for merchant marine and inland transportation personnel, but at this time there is little union involvement in the offshore industry.

The size of the vessel determines the manning requirements and types of licensed personnel required to be aboard the vessel. A mineral and oil crew or utility vessel under 100 gross tons requires only two licensed ocean operators and two unlicensed deckhands, but a mineral and oil vessel over 1,000 gross tons requires a minimum of four unlimited licensed deck officers, four unlimited licensed engine officers, six able seamen, three ordinary seamen, three oilers and three firemen/water tenders. Most vessels also have a cook and, on larger ocean-going vessels, an assistant cook and a radio officer.

Descriptions for the most notable maritime transportation licensed positions are:

**Deck Department**

**Master** (Captain) in command of the ship and its crew: Responsible for all ship functions including navigation, cargo maintenance, state of the vessel, ship's business, payroll and compliance with maritime laws, rules and regulations.

**Chief Mate:** The officer next in rank to the Master, supervises Deck Department operations and maintenance, and has charge of cargo loading, maintenance and off-loading operations.

**Second Mate:** The ship navigational officer, is responsible for plotting the ship's course and position and verifying day's run, maintaining ship's charts and, normally, performing watchstanding duties.

**Third Mate:** The navigational watchstanding officer, is generally assigned collateral duties such as responsibility for ship safety, rescue and survival equipment.

**Boatswain or Bosun:** The leading seaman and immediate supervisor of the unlicensed deck personnel, which includes able seamen and ordinary seamen; supervises and assists in the maintenance and repair of deck gear.

**Able Seaman** (AB): Performs all regular and emergency duties that are required by the deck service of a ship except navigation of the vessel, including standing

wheel watch and lookout; assisting deck officers on watch in attending mooring lines; tending gangways, safety nets and lights; assisting in handling liquid cargo and ballast such as handling valves, connecting and disconnecting vessels cargo and bunker hoses; assisting in tank-cleaning operations such as handling butterworth equipment and plates, opening and closing tank tops, cleaning holds, splicing wire and line and slushing; operating deck and anchor windlasses and capstan; and assisting the Bosun in operating the cargo booms and rigging.

**Ordinary Seaman** (OS): Performs deck maintenance such as washing paint work and chipping, scraping, painting and scrubbing decks; assists Able Seaman; stands lookout; may be required to stand a bridge watch. This title is an entry rating in the Deck Department.

**Engine Department**

**Chief Engineer** (Chief) in command of the Engineering Department and engineering personnel: Responsible for operation, maintenance and repair of all ship machinery and control systems (excluding electronic navigational aids and external communications equipment), engineering department payroll and compliance with martime laws and regulations covering machinery testing and inspection.

**First Assistant Engineer:** The officer next in rank to Chief Engineer; is responsible for daily activities of engine room personnel, supervises maintenance and repair functions, keeps preventive maintenance records and supervises spare part inventory and control operations.

**Second Assistant Engineer:** Normally a watchstanding officer or duty officer in a periodically unattended engine room space; has collateral assigned duties such as responsibility for maintenance and repair of boiler and associated auxiliary equipment and water treatment.

**Third Assistant Engineer:** Normally a watchstanding officer or duty officer in a periodically unattended engine room space; has collateral duties that include responsibility for water evaporation and lubricating oil system maintenance and repair.

**Chief Electrician:** In immediate charge of vessel electrical systems, makes inspection rounds of electrical equipment, troubleshoots, repairs electrical malfunctions and performs preventive maintenance.

**Tankerman:** In charge of liquid cargo and fuel transfers, tank cleaning and gas-freeing operation; must have a thorough knowledge of pollution regulations and pollution prevention measures.

**Oiler:** Performs maintenance and repair work in engine room, machine shop and other machinery spaces; while on watch makes frequent rounds in

engine spaces to check proper operation of machinery and auxiliary equipment; answers engine room telegraph; maintains bell log.

**Fireman/Watertender** (FWT): Fires boilers, cleans burners and fuel oil strainers, maintains steam pressure and boiler water level, controls fuel oil temperature and pressure and observes stack for proper combustion.

**Oiler/Maintenance Utility:** Hold ratings as Fireman/Watertender and Oiler; may be a watchstander or day worker; performs general maintenance and repair work in machinery spaces.

**Wiper:** Performs general cleaning and other duties as assigned in the machinery spaces. This title is an entry rating in the Engine Department.

**Radio Department**

**Radio Officer:** Responsible for equipment operation, maintenance and repair of external communications, performs radio watch duties and maintains and repairs electronic navigational-aid equipment.

**Steward Department**

**Steward:** Supervisor and head of Steward Department; in charge of all food and service personnel, meal planning, ordering, issuing and inventory of food, linen and sanitary supplies.

**Chief Cook:** In charge of galley and all food preparation, including butchering and cooking meats, poultry, fish, soups, gravies and sauces; assists the Steward in preparation of menus.

**Galley Utility:** Under direction of all cooks, cleans galley and utensils and assists in preparing raw vegetables. This title is an entry rating in the Steward Department.

**Messman:** Serves three meals a day and is responsible for cleanliness of messrooms. This title is an entry rating in the Steward Department.

## Merchant Marine

Seafaring employment is the responsibility of the steamship companies operating U.S. registered merchant ships. Most hiring is done through maritime labor union hiring halls or shipping company marine personnel offices. The size of the seafaring workforce is declining slowly, a trend expected to continue for some time, particularly for inexperienced people in entry positions. Employment opportunities are better for graduates of maritime training programs and a slow increase should continue through 1985. Officer entry training usually takes three to four years to complete, but some schools for crew entry training take less than one year to complete. Fees or tuition and entrance requirements vary considerably among training institutions.

Most workers on 1,000 gross tons or larger vessels belong to one of three departments. The deck department handles ship navigation and operation. The engine department keeps the ship going and takes care of mechanical repairs. The steward department is responsible for meals and living accommodations. Progressions within these three departments, beginning at the entry position of each, are:

**Deck:** Ordinary seaman, able seaman, boatswain or bosun, third mate, second mate, chief mate and master.

**Engine:** Wiper, fireman, oiler, water tender, third assistant engineer, second assistant engineer, first assistant engineer and chief engineer.

**Steward:** Messman or utility man, second cook and baker and chief cook.

Since entry into maritime service is essentially controlled by maritime unions and there are more people than jobs now, it is becoming more difficult to find positions. Unlicensed seafarers do not need a high school diploma, but high school graduates with some vocational training or special experience can find a beginning job more easily. Most deck officers and marine engineers are graduates of accredited nautical schools. The U.S. Merchant Marine Academy, Kings Point, New York, and six state maritime academies, including Texas Maritime Academy in Galveston, offer three- and four-year programs in nautical science or marine engineering. The Maritime Administration, which operates the U.S. Merchant Marine Academy, also offers study programs in such marine specialty areas as diesel and radar training.

Earnings for unlicensed seamen vary according to the job and the type of ship. Crew members on American merchant ships enjoy excellent pay and working and living conditions. Most jobs provide 10 or more days' paid vacation for each 30 days worked. Typical monthly earnings by position, including base wage and average overtime, are: Foodhandler, $1,109; wiper, $1,328; ordinary seaman, $1,117; able seaman, $1,429; third mate, $2,472; radio operator, $2,655. Ship employees also receive many fringe benefits, including free room and board while at sea, uniforms, laundry services, transportation allowances and bonuses.

## Inland Marine Transportation (Towing Industry)

The inland transportation or barge and towing industry has more than 90 Texas-based companies operating along the Gulf Intracoastal Waterway and inland waters and in the Gulf of Mexico. These firms operate towboats, tank barges, deck barges, hopper barges, tugs and ocean-tug/barge combinations. Continued expansion of the industry has made it difficult for companies to find sufficient personnel to man the new

equipment being built. The increasing cost and complexity of barges, tugs and towboats require skilled people who are familiar with the equipment's operation.

Several schools provide specialized training for this industry. Brazosport College, Lake Jackson, Texas, has a two-year Oceanic and Marine Technology program which includes basic training in oceanic and marine technical skills and preparation for the U.S. Coast Guard able seaman licensing examination. Students earn an associate of applied science degree.

The National River Academy, Helena, Arkansas, offers a deckhand training program, a firefighting, first aid and emergency training course and special programs for upgrading masters/western rivers, pilots/western rivers, operators/inland waters and tankermen. The deckhand training program is a particularly good introduction for those interested in a career in the barge and towing industry.

The Harry Lundeberg School, Piney Point, Maryland, is administered by the Seafarers International Union of North America. It offers basic vocational education programs for ocean-going or inland vessel operations, upgrading programs for ocean-going and Great Lakes seafarers and a high school equivalency program.

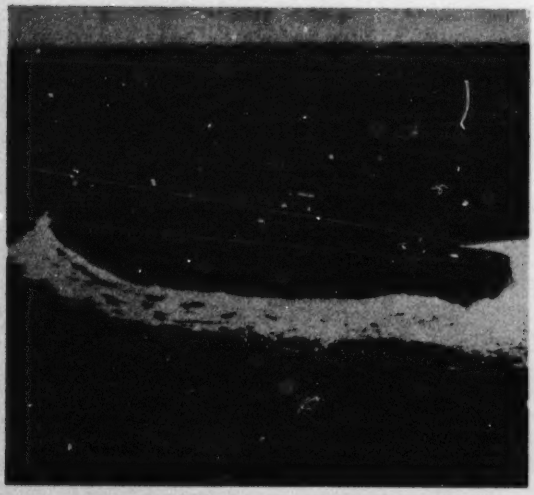
Individual companies also may have schools to train deckhands, mates and tankermen, and practically all companies provide on-the-job training.

The deckhand is the basic position in the towing industry. Depending on the nature and size of the cargo and towboat, the deckhand prepares the barges for towing and breaks them apart after reaching the destination. Deckhands usually work a schedule of six hours on, six hours off and spend a specified number of days on and off their jobs each month — 20 days on and 10 days off or 14 days on and seven days off are typical.

The tankerman is important when petroleum and liquid cargos are being moved. He is responsible for loading and unloading cargos and must have a thorough knowledge of environmental protection standards and pollution prevention measures. This is a U.S. Coast Guard-licensed position and requires considerable knowledge of hazardous cargo handling.

The captain, or master, and his assistant, the pilot or first mate, are responsible for navigating the vessel safely. They each stand two six-hour watches per day which include steering the vessel, monitoring the radio and radar and filling out the log. A second mate may be required on longer routes and the schedule is changed to two four-hour watches per day. A steersman, who usually is training to become a mate or pilot, sometimes steers the vessel. Larger vessels may have an engineer and a cook, while the deckhands perform these duties on smaller vessels.

Wages on inland towing vessels vary according to the company, work location and experience, with



deckhands ranging between $35 and $45 per day, mates, $75 to $90 per day and masters, $105 to $125 per day. They are paid for the actual number of days they work.

## Offshore Supply and Transportation

There are approximately 2,850 offshore oil and gas exploration support fleet vessels operating in U.S. waters, the majority of which are based in Louisiana and Texas. These include tugs, towboats, supply and tug-supply vessels, crew boats, utility boats, geophysical vessels and other miscellaneous vessels. Approximately 65 percent (1,850) are under 100 gross tons, 27 percent (785) are between 100-199 gross tons, 7.5 percent (210) are between 200-999 gross tons and only .5 percent (5) are over 1,000 gross tons.

The size of the vessel determines the number of positions available. Vessels under 100 gross tons do not require U.S. Coast Guard (seaman) papers for entry-level positions such as deckhand, unlicensed engineer or cook, but vessels over 100 gross tons require seaman's papers for such entry ratings as ordinary seaman, wiper and food handler as well as licenses for other positions.

Seaman's papers can be obtained through application to a U.S. Coast Guard Marine Inspection office by anyone 16 years of age or older who has a letter of commitment of employment from an owner or operator of a vessel over 100 gross tons. The application must be accompanied by a recent passport-type photograph, a birth certificate or passport, an original Social Security card and a completed application form CG-719B. Although the Coast Guard will issue a Merchant Marine document to 16-year-olds, it is very unlikely that they

will be hired to serve on a vessel before they are 18. Because of child labor laws and the hazardous nature of the work, insurance carriers will not cover 16- or 17-year-olds. Some insurance carriers will cover those under 18 if they are on board temporarily in a nautical science school program.

The general duties for entry-level deckhands include standing wheel and radio watch as required, carrying out mooring or anchoring duties, maintaining the vessel, loading and unloading cargo and cleaning the vessel between trips. The duties for engineers, mates and masters require considerable on-the-job training to perform.

Training for entry-level positions is handled through industry on-the-job programs or, in Louisiana, at the Louisiana Marine and Petroleum Institute in Chauvin and Young Memorial Vocational Technical School in Morgan City. Several license preparation schools are located in Louisiana for upgrading in the above entry-level positions. In Texas, Brazosport College in Lake Jackson provides training and preparation for the able seaman license exam, while Texas A&M University provides a four-year degree program in marine transportation and advanced training in radar and marine firefighting. Texas license preparation schools are located in Houston and Port Arthur. In addition to on-the-job training, engineers may attend special technical schools provided by diesel engine distributors and manufacturers.

Most positions on U.S. flag vessels require licenses and seatime experience to advance. The progression on a vessel under 100 gross tons would be two years from deckhand to licensed ocean operator. In the deck department of vessels over 100 gross tons it takes one year for an ordinary seaman to upgrade to able seaman, two years to upgrade to limited licensed mate and one year seatime to upgrade from mate to limited licensed master. In the engine department, the seatime requirement to upgrade from wiper to oiler is six months, from oiler to limited licensed engineer, two and a half years, and another year to upgrade to limited licensed chief engineer.

Currently in the industry there is a critical shortage of skilled unlicensed and limited licensed mariners in the following positions: oiler, licensed engineer, able seaman, operator (100 gross tons or less) and master and mate (over 100 gross tons). Considering the seatime requirements, it takes at least six months to move from ordinary seaman (entry rating) to oiler and one year to move to able seaman. There is no shortage, however, in such entry-level positions as ordinary seaman and deckhand.

The most common work schedule for Gulf of Mexico boats is 14 days on and seven days off with wages being paid on a per-day basis. There are other schedules, including 14 days on and 14 days off or seven days on and seven days off. The pay scale for various

positions is deckhand or ordinary seaman, $40-$50 per day; able seaman, $54-$68 per day; oiler, $40-$70 per day; unlicensed engineer, $60-$80 per day; cook, $45-$70 per day; ocean operator, $75-$95 per day; limited licensed mate, $75-$90 per day; limited licensed master $105-$125 per day; limited licensed engineer, $80-$100 per day; and limited licensed chief engineer, $105-$125 per day. Wages are paid for the number of days actually worked.

Most companies require a complete physical examination (which they pay for) and all candidates for Coast Guard licenses must pass a U.S. Public Health Service examination. Anyone with a pre-existing physical condition that might preclude advancement should check these requirements with the Coast Guard office before planning a career in this industry. The work is physically demanding and good general health is necessary. Medical care for seamen is provided through the U.S. Public Health Service hospitals.

## Resources

**Merchant Marine**

Calhoun MEBA Engineering School
9 Light Street
Baltimore, MD 21202

Louisiana Marine & Petroleum Institute
P.O. Box 236
Chauvin, LA 70344

Harry Lundeberg School
Piney Point, MD 20674

Marine Cooks & Stewards Training Program
350 Fremont Street
San Francisco, CA 94105

National Maritime Union of America
346 West 17th Street
New York, NY 10011

Office of Maritime Labor & Training
Maritime Administration
U.S. Department of Commerce
Washington, D.C. 20230

Seaman's Church Institute of New York
15 State Street
New York, NY 10004

Texas Maritime Academy
Texas A&M University at Galveston
P.O. Box 1675
Galveston, TX 77553

U.S. Merchant Marine Academy
Kings Point, NY 11024

Young Memorial Vocational Technical School
P.O. Drawer 2148
Morgan City, LA 70380

**Inland Marine Transportation**

American Waterways Operators, Inc.
1600 Wilson Blvd., Suite 1101
Arlington, VA 22209

Brazosport College
Oceanic & Marine Technology
500 College
Lake Jackson, TX 77655

Harry Lundeberg School
Piney Point, MD 20674

Louisiana Marine & Petroleum Institute
P.O. Box 236
Chauvin, LA 70344

National River Academy
P.O. Drawer 827
Helena, AR 72342

Young Memorial Vocational Technical School
P.O. Drawer 2148
Morgan City, LA 70380

**Offshore Supply and Transportation**

Brazosport College
Oceanic & Marine Technology
500 College
Lake Jackson, TX 77655

Louisiana Marine & Petroleum Institute
P.O. Box 236
Chauvin, LA 70344

Offshore Marine Services Association
2939 ITM Building
New Orleans, LA 70130

Texas Maritime Academy
Texas A&M University at Galveston
P.O. Box 1675
Galveston, TX 77553

Young Memorial Vocational Technical School
P.O. Drawer 2148
Morgan City, LA 70380

# Offshore Mineral, Oil and Gas Industry

The offshore revolution has created great interest and many opportunities for industrial expansion along the Texas coast. Texas and Louisiana have contributed most of the offshore production, with the latter being the most productive. Offshore oil and gas production involves exploration, drilling, underwater services, specialized construction activity, specialized marine transportation requirements, highly skilled engineering services and many interrelated services.

The basic components of the offshore mineral industry are marine exploration, marine construction, offshore drilling and marine services. The marine services area is covered under marine transportation and marine construction is partially covered under shipbuilding.

A great number of jobs exist in the offshore drilling industry; there presently are approximately 15,000 offshore rig workers employed on rigs in U.S. waters. An additional 1,500 new jobs will be created each year for offshore rig workers. These jobs, combined with the high industry employee turnover, means nearly 3,000 new people per year will be needed to fill these positions. It would appear that the most pressing needs will be for qualified people in highly skilled classifications such as driller, mechanic, electrician, subsea engineer, assistant driller, derrickman, crane operator and toolpusher. Most present positions are being filled by people trained on the rigs or in the drilling companies' own in-house training programs.

There are enough people available to be trained for the industry, but careful selection and orientation is important. Personal characteristics which must be considered are attitude toward work, ability to withstand long hours and extended days of work on the rig, willingness to work hard and contribute as part of a team, and ability to accept harsh supervision. The rig worker must be able to accept isolated living conditions, long-term separation from family, lack of control of social activities and a harsh, sometimes dangerous working environment.

The entry-level position on the offshore rig is the roustabout who is responsible for assembling, cleaning and repairing, maintaining, loading and unloading boats, moving pipe and performing other general tasks for the drill floor crew. Roughnecks, the next level, are the crucial manning force in the drilling operation. Their job is to work as a team, in conjunction with the derrickman from aloft, under the guidance of the assistant driller. The roughneck assembles and dismantles the drill string of hollow steel pipes at the rotary table. This involves unscrewing 40-foot sections of pipe with large mechanical tongs as pipe is removed from the bore hole to replace drilling bit.

The derrickman rigs derrick equipment and operates pumps to circulate mud through drill holes, weighs clay and mixes drilling mud, cleans and oils pulleys, blocks and cables, repairs pumps and occasionally fills in for the driller.

The driller drills wells, operates draw works, observes pressure gauges, controls the speed of the rotary table, regulates tool pressure at the bottom of the borehole, examines drilling or core samples, fishes to recover lost and broken drill bits, casings and drill pipe from the well, records footage drilled and repairs and replaces defective parts of machinery.

The drilling foreman, generally known as the toolpusher, supervises and coordinates the drilling operation, rig erection, dismantling and moving, orders equipment and supplies for the drill site and crew, orders installation of the control devices on the well and generally supervises the entire drilling operation for the rig personnel.

Other positions on offshore rigs that presently are in short supply are mechanics, electricians and subsea engineers; however, these represent a crucial part of the offshore drilling operation and require considerable technical training.

The work schedule on the rig depends on the general location and, to some extent, the preference of the crew and company policy, but seven days on, seven days off or 14 days on, 14 days off is used in the Gulf of Mexico. Offshore pay is good and living accommodations are usually good, but the work is extremely hard, dangerous and socially isolated.

A roustabout working seven days on, seven days off can earn about $15,000 to $16,000 his first year. On the same schedule a roughneck can earn between $19,000 to $20,000; a derrickman, $21,000 to $22,000; an assistant driller, $24,000; a driller, $28,000 to $30,000; a toolpusher, $43,000 to $50,000; a mechanic or electrician, about $25,000; a

barge engineer, about $27,000; and a subsea engineer, about $30,000. Earnings depend on the work schedule, total number of hours worked, personnel and experience. Food and living accommodations are provided on the rig at no cost to the worker.

Promotions are rapid for those who like the work and are good at it, particularly considering the high turnover rate. A roustabout can be promoted to roughneck in three months, from roughneck to derrickman in nine months, from derrickman to assistant driller in about 18 months, and from driller to toolpusher in about two years. This progression depends on the company's training program and promotion policy.

Training programs for the offshore drilling industry are available through the International Association of Drilling Contractors, the Petroleum Extension Service of the University of Texas at Austin, offshore drilling equipment manufacturers and several technical schools located in Texas, Oklahoma and Louisiana. Drilling companies and oil and gas production companies pay most of these costs for their student/employees.

## Resources

International Association of Drilling Contractors
P.O. Box 4287
Houston, TX 77210

National Ocean Industries Association
1100 Seventeenth Street, N.W.
Suite 410
Washington, D.C. 20036

Nicholls State University
401 Hickory
Thibodeaux, LA 70301

Petroleum Extension Service
University of Texas at Austin
Drawer 5, University Station
Austin, TX 78712

Petroleum Training Center
University of Southwestern Louisiana
Lafayette, LA 70504

# Commercial Diving

Diving is regarded by some as such a glamorous and exciting water-related career that they overlook the hard work, boredom, isolation and safety hazards that face the working diver. Most commercial diving is done with either a self-contained underwater breathing apparatus or a surface air supply pumped through a long hose. Saturation diving using mixed gases and underwater diving chambers is used at deeper depths and new technology has developed completely self-contained diving systems that can go to 2,000 feet. Most of this technology has evolved from the needs of the offshore oil and gas exploration and production industry.

Commercial diving jobs vary greatly in terms of skill requirements and work environments. Good mechanical skills are a must. Good welders, pipefitters or other craftsmen can be trained to be first class divers. Some jobs located in very remote offshore areas require several days of preparation while others, in shallow waters near shore, require little preparation time. Career opportunities may be limited by the individual's versatility and technical training.

Some commercial diving schools provide entry-level training, but most specialized training is received on-the-job or through company-sponsored programs. Familiarity with the types of special equipment used, particularly for deeper dives, also is important. Over 90 percent of commercial divers receive some formal training, either from the military or through commercial schools. Nearly all commercial divers must complete a course of study in a diver training school before they are hired. Training takes from four to six months and costs about $2,500. Since the training is fulltime, students must be able to meet living expenses during this time.

Divers normally are paid on a 12-hour shift basis with travel allowances and quarters paid by the diving contractor. The entry-level position normally involves working in the shop on diving and related equipment for low pay. The next level is tender or diver/tender but these usually are filled by air-qualified divers. The tender or diver/tender position pays about $300 to $400 per week in the Gulf of Mexico and generally lasts at least one full season or one year.

In the second season or full year, a good diver can earn between $20,000 and $24,000 by working regularly. This increases to between $30,000 and $45,000 in the third and fourth years. The top pay in the industry for a good saturation diver can be as high as $75,000 with regular offshore work on choice diving jobs.

The diving season in the Gulf of Mexico is lengthening and already is a year-round operation in some areas with allowances for weather and type of project.

Good health is imperative for a commercial diver and regular physical examinations are required by company policy. A person must be a skilled craftsman such as a welder, mechanic, pipefitter, etc., before realizing success as a diver in the offshore industry. It is important to gain experience in these areas. Prospects should be prepared to spend several months, or years, learning the technical side of diving operations. A smaller firm may provide a more general education on diving operations, while larger firms offer more knowledge about more sophisticated diving equipment. A thorough knowledge of safety procedures is an absolute necessity in commercial diving.

## Resources

Association of Diving Contractors
1799 Stumpf Boulevard
Gretna, LA 70053

The Ocean Corporation
5709 Glenmont
Houston, TX 77081

## Commercial Fisheries

Of the more than 28,000 Texas commercial fishing licenses issued in 1978, less than one-fourth were for fulltime commercial fishermen. Most of these were for the shrimp fisheries which represent over 95 percent of the total value of commercial fish landed in Texas. There are about 3,200 commercial Gulf shrimp boats licensed in Texas and about 3,700 licensed bay shrimp boats.

The average Gulf shrimp vessel is usually operated by three people — the captain, the rigger and the header. The captain operates the vessel and assumes responsibility for vessel maintenance, planning and supervising the fishing operation and administering the business affairs of the vessel. He also may assist the rigger in handling trawls. The rigger, or rigman, does much of the deck work, operates the trawls and booms, cleans the net and helps sort, dehead, ice and unload the shrimp. The header deheads the shrimp, assists the rigman with the trawls, sorts the catch, ices the shrimp and assists the captain as directed.

Oystering and crabbing contribute less to the total value of Texas' commercial fisheries, but still can represent a good living. Oystering has declined in recent years because some bay systems have been closed, but commercial crabbing has increased as the price of crab meat and the availability have increased. Oystering can be a one-person operation with the oysterman or dredger working from a small fishing boat. The crab fisherman also works independently in his own boat, baiting crab pots and traps and "running" several hundred traps which he has baited, collecting crabs for processing.

Traditionally, commercial fishing has been a family business. In recent years, however, there has been an increase in the number of fishing fleets which has created more jobs outside the individual, family business-

es. Persons interested in commercial fishing may find it relatively easy to sign on as a header to learn more about the industry and possible career opportunities, particularly on a shrimp trawler that operates as part of a fleet. A header's pay is based on the total shrimp catch returned for processing. Once the job is mastered, a header can advance to rigger and captain with more experience. It is even possible to eventually own the vessel.

A major disadvantage is that commercial fishing is demanding, often rigorous, work under difficult conditions in isolated locations. The financial rewards are good for a captain or vessel owner, but the harvest is a perishable product that must be processed quickly and is not always available in quantities needed to meet daily operating costs. Also, the work is seasonal since shrimping is not permitted in bays during some months of the year.

## Resources

National Marine Fisheries Service
9450 Koger Blvd., Duval Building
St. Petersburg, FL 33702

Texas Shrimp Association
403 Vaughn Building
Austin, TX 78701

Director of Fisheries
Texas Parks & Wildlife
4200 Smith School Road
Austin, TX 78744

# Shipbuilding

Shipbuilding in the Gulf Coast area is a highly diversified industry. It is made up of small shipyards building and repairing fishing vessels, barges, towboats, crew and tug boats, and larger yards building and repairing merchant ships, drilling rigs and oil industry support vessels. There are approximately 70 shipyards of all sizes in Texas, providing a variety of shipbuilding and ship repair services and employing about 10,000 employees with an annual payroll of more than $160 million.

Despite advances in technology and constant increases in capital investments, the industry remains labor intensive with most positions falling into the skilled craftsman category. Welders join the metal pieces of the ship together; shipfitters see that each piece is correctly located and securely fastened by riveters, welders and other workers; chippers trim edges; caulkers make joints watertight; engineers and machinists prepare, install and test propulsion equipment; electricians, carpenters, boilermakers, sheetmetal workers, painters, plumbers and others construct internal systems and facilities; and crane operators lift preassembled parts into place.

Employers prefer men and women with a background in mathematics, machine shops, blueprint reading and mechanical drawing. Apprentice programs offer work and classroom instruction in technical subjects. Most apprenticeships are controlled by joint councils made up of representatives of the craft union and the employers.

Apprenticeships handled by craft unions provide the training needed to advance in a particular craft. Some prior training in a vocational school or high school technical trades program and, in some instances, actual work experience is helpful. A new employee begins as a helper or learner and progresses through various stages to higher skill levels with required training and actual work experience.

Shipyard workers earn good incomes and enjoy good benefits. The future employment outlook in the Gulf Coast area is good. It is possible to advance to a production department head or high supervisory position. The current annual earnings for those in journeyman classifications may exceed $20,000. Entry-level positions presently pay up to $16,000 and $17,000 for 50 40-hour weeks. There is a current shortage of trained welders, shipfitters, electricians and crane operators. Working conditions in a shipyard vary from outdoor areas to confined spaces in large shop areas and job responsibilities for new construction are different from those for repair.

Management, engineering and naval architectural positions offer good employment opportunities in the shipbuilding industry. Most require college degrees and

work experience for career advancement. Working conditions, salary and fringe benefits are attractive.

Turnover in some shipbuilding skilled positions is high and positions often cannot be filled by the unions. These must be filled through company recruitment. A physical examination is almost mandatory for shipyard employment because of the often hard, physical work required and the possibility of work-related injury.

## Resources

Louisiana Shipbuilding & Repair Association
2936 International Trade Mart
New Orleans, LA 70130

Marine Engineering Technology
Mississippi State University
P.O. Box 5404
Mississippi State, MS 39762

Office of Maritime Labor and Training
Maritime Administration
U.S. Department of Commerce
Washington, D.C. 20230

Shipbuilders Council of America
600 New Hampshire Ave., N.W.
Washington, D.C. 20037

Texas Shipyard Association
P.O. Box 1093
Freeport, TX 77541

# References


Block, Richard A., ed., **Working Aboard Oilfield Vessels (Questions and Answers).** Louisiana: Marine Education Textbooks, 1979.

Harry Lundeberg School, **The Harry Lundeberg School** (Piney Point, MD. Bulletin 1977-78).

Heitzmann, William Ray, **Opportunities in Marine and Maritime Careers** (Skokie, Illinois: National Textbook Company, 1979).

Livy, Bryan, and Vant, James. **Formula for Selecting Roughnecks and Roustabouts** (First published in: **Personnel Management** February 1979, Vol. II No. 2).

McKinnerney, Beryl, and Clark, Donald L., **Marine Occupations in the Texas Coastal Zone** (Texas A&M University Sea Grant College Program, TAMU-SG-73-606).

Maritime Administration, **Abstracts of Maritime Education and Training Publications** (U.S. Department of Commerce, Washington, D.C. March 1977).

**Merchant Marine Occupations** (Moravia, NY: Chronicle Guidance Publications, Inc., September 1979).

National Ocean Industries Association, **Where Land and Water Meet** (Washington, D.C., July 1979).

Science Research Associates, Inc. Occupational Brief, **Shipbuilders** (Science Research Associates, Inc., 1977), SRA Occupational Brief 156.

Texas A&M University Sea Grant College Program, **Summary of Marine Personnel Selection and Training Seminar** (College Station, Texas, 1979).

Texas A&M University Sea Grant College Program, **Summary of Marine/Offshore Manpower Requirements and Training Ser..inar** (College Station, Texas, 1979).

U.S. Department of Commerce. **Information Concerning Employment and Training Opportunities in the U.S. Merchant Marine** (Washington, D.C., Government Printing Office).

U.S. Department of Commerce. **Workforce Supply and Demand Study, for the Offshore Oil and Gas Exploration Support Craft Industry,** 1979-1988 (Washington, D.C.: Government Printing Office, 1979).